

Utilization of Biogas from the City's Source Separated Organic Material Processing Facilities

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To:	Public Works and Infrastructure Committee
From:	Geoff Rathbone, General Manager, Solid Waste Management Services
Wards:	All
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SUMMARY

This report summarizes current plans to utilize the biogas produced at City-owned facilities from the anaerobic digestion of organic material collected via the Green Bin program, the commercial Yellow Bag program and other current and future source separated organic material collection programs.

Financial Impact

There are no direct financial impacts arising from this report

DECISION HISTORY

Council at its meeting of July 16, 17, 18 and 19, 2007, when considering the report "Climate Change, Clean Air and Sustainable Energy Action Plan: Moving from Framework to Action", and by adopting Recommendation 9h) item iii), directed the Acting General Manager of Solid Waste Management Services to report in 2007 on: "plans to utilize the digester gas from the City's anaerobic digestion facilities that process organic materials collected through the Green Bin program."

The report is available at:

<http://www.toronto.ca/legdocs/mmis/2007/cc/decisions/2007-07-16-cc11-dd.pdf>

ISSUE BACKGROUND

Processing the organic fraction of the solid waste stream by anaerobic digestion and using the resulting biogas to produce renewable energy helps achieve the City's 70% waste diversion goal as well as the broader goals stated in the Climate Change, Clean Air and Sustainable Energy Action Plan.

The Action Plan document can be found at:

[Climate Change, Clean Air and Sustainable Energy Action Plan](#)

Solid Waste Management Services currently collects source separated organic material (SSO) at the rate of approximately 110,000 tonnes per year from the single-family residential Green Bin and commercial Yellow Bag programs.

Implementation of the initiatives in the 70% waste diversion plan, especially extension of SSO collection to residences in multi-family dwellings and to City ABC&Ds, as well as population growth, are expected to increase the total annual tonnage of SSO collected via City programs to approximately 180,000 tonnes beyond 2010.

The 70% waste diversion plan can be found at:

<http://www.toronto.ca/legdocs/mmis/2007/ex/bgrd/backgroundfile-3799.pdf>

The City's existing Dufferin organics processing facility processes approximately 30,000 tonnes of SSO per year. The facility includes an anaerobic digestion operation that produces approximately 110 cubic metres of good quality biogas per tonne of SSO processed; comparable to the performance of European facilities processing source separated residential organic waste. The existing facility does not include a biogas utilization system and the biogas is currently combusted in a flare.

Council approved a long-term plan for SSO processing when it adopted Report PW6.1 of the Public Works and Infrastructure Committee at its meeting of June 19, 20 and 22, 2007. The long-term SSO processing plan requires that the first 110,000 tonnes per year of the total annual SSO generation are to be processed at two new City-owned facilities, and the remainder to be processed at other public and/or private facilities.

Council approved the construction of two new City-owned SSO processing facilities: a new facility to process 55,000 tonnes per year of SSO at the Disco solid waste transfer station; and, the reconstruction of the existing SSO processing facility at the Dufferin waste management facility to increase its capacity to 55,000 tonnes of SSO per year. The new Disco and Dufferin SSO processing facilities will include anaerobic digestion processing operations to produce biogas, and systems to convert the biogas into fuel, for off-site use in vehicles or other applications, or into electricity and heat via on-site cogeneration systems.

The report is available at:

<http://www.toronto.ca/legdocs/mmis/2007/cc/decisions/2007-06-19-cc10-dd.pdf>

Construction of the new Disco SSO processing facility is tentatively scheduled to begin in 2009, with the goal of being operational by the end of 2010. Construction of the new Dufferin SSO processing facility is tentatively scheduled for 2011, with the goal of being operational in 2013. The process to procure a design/build/operate contract, or contracts, for the new facilities will encourage proponents to propose aggressive schedules with the goal of making both facilities operational as soon as possible.

COMMENTS

Existing Dufferin Organics Processing Facility

The existing Dufferin organics processing facility will continue operations at least until the new Disco SSO facility is operational and afterwards until construction of the new Dufferin facility requires that the existing facility be decommissioned to make space available or to transfer the usable equipment to the new Dufferin SSO facility. Decommissioning of the existing Dufferin organics processing facility could occur as early as 2011.

There are no plans to install new systems to utilize the biogas generated at the City's existing Dufferin organics processing facility because the potential operating period before decommissioning is less than the term needed to make it feasible to participate in current renewable energy incentive programs and limited staff resources are focused on the implementation of the 70% diversion plan and the construction of the two new SSO processing facilities.

New Disco and Dufferin SSO Processing Facilities

Planning for the development of the new SSO processing facilities will include a cost benefit analysis of biogas utilization options, i.e., for converting the biogas energy into fuel for off-site use, electricity and/or heat. The analysis will compare options on the basis of biogas energy conversion and utilization efficiencies, equipment investment and operating costs, operating cost offsets and revenue streams, including revenue available under existing incentive and standard offer programs for electricity from renewable sources.

Based on the performance of the anaerobic digestion operation at the existing Dufferin organics processing facility, it is estimated that the anaerobic digestion of 110,000 tonnes per year of SSO at the new Disco and Dufferin SSO facilities could produce over 12 million cubic metres of biogas annually. Using the biogas to fuel on-site cogeneration systems could produce approximately 25,000 MWh per year of electricity, of which approximately 17,000 MWh per year would be in excess of facility operating requirements and would be available to supply the local electrical grid. The excess electricity is equal to the annual electricity consumption of approximately 1,700 homes.

In addition to electricity, the co-generation systems could produce heat energy in excess of the operating requirements of the SSO processing facilities. The heating requirements of the other facilities at the Disco and Dufferin sites will be assessed and opportunities to replace heating energy from non-renewable sources with excess heat from biogas utilization will be investigated.

Staff from the Toronto Energy Efficiency Office will participate on the new SSO facility development team and will provide guidance on the analysis of biogas utilization system options.

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SIGNATURE

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